IN THE SPECIFICATION:

Please amend the paragraph on page 7, lines 8-15 as follows:

Whereas the energy absorption means in the form of a depth modulation device, or a depth modulator or depth scanner, can scan the target volume rapidly and in columns because of the drive of the absorber wedge system by means of a linear motor having an air bearing, there is sufficient time for lateral displacement of the target volume in the two directions x and y of a plane, so that a patient table, which carries the target volume and can be displaced in two lateral directions transverse to the ion beam during an irradiation procedure, has sufficient time to scan gradually column by column and overlap next to one another.

Please amend the paragraph on page 9, lines 5-17 as follows:

In a further preferred embodiment of the invention, the target volume carrier remains stationary during treatment and the ion beam is deflected in the gantry plane by the deflection magnets during irradiation. Thus, instead of displacing the patient couch, the ion beam is deflected by varying the magnetic field in the last deflection magnet in the gantry. This results advantageously in the following required movement sequence in three degrees of freedom: the beam deflection with the highest speed occurs by means of the energy absorption means, or depth modulator. At a medium speed (e.g. 4 mm every 1 to 2 s), the beam is guided in the gantry plane by the deflection magnets to the next column. The slowest movement is the rotation of the gantry, which is carried out, after the irradiation of a row of columns, by rotating the gantry system to the next row of columns. The advantage of that ion beam scanning system is that the

patient does not have to be moved and the gantry system does not have to move back and forth during irradiation but can be rotated stepwise.

Please amend the paragraph on page 16, lines 14-25 as follows:

Figure 3 shows the principle of the scanning of a target volume in columns using the embodiment according to Figure 1 with ion beam 3 in the ion beam direction 17 and penetrating depth of the ion beam 3 in the z-direction 12. In that embodiment, the target volume is displaced mechanically in the direction of the arrows X and Y, whilst the ion beam 3 of a rigid ion beam guidance system retains its central direction. By the depth modulation or depth scan caused by the energy absorption means, the volume elements 9 of the target volume 5 are scanned in columns, the extent 1 of the broadened Bragg peak corresponding to the length of the column or the depth of the target volume at that point by virtue of summation of the Bragg curves 36 to 43. As Figure 3 clearly shows, healthy tissue 10 can be sparred from irradiation to as great an extent as possible, whilst the tumour tissue can assume a very wide variety of shapes, which means that only the depth modulation has to follow the extent of the tumour tissue in one direction of coordinates, for example along the z-coordinate.

Please amend the paragraph on page 19, lines 19-29 as follows:

Lesser demands are made on the dynamics for the edge-delimination device 20. Figure 7 shows an edge-delimination device in the inoperative position having displaceable shutter elements 21. In that example it consists of six individual rectangular tungsten plates 45 to 50, which can be displaced separately from their inoperative position shown in Figure 7 towards the

center. For that purpose, the tungsten plates 45 to 50 are arranged offset in their height, so that they do not hinder one another when they are being pushed together. When the ion beam approaches the edge of a tumour tissue, or target volume 5, the corresponding edge shutter 19, as shown in Figure 8, can be displaced so enabling sharp delimination of the edge for the relatively broad ion beam. In principle, any edge of the tissue can be delimited even by three height-staggered shutters consisting of rectangular tungsten plates, but six plates have the advantage of offering greater variation.

Please amend the paragraph on page 22, lines 23-28 as follows:

Directly thereafter the next memory region having a different series of figures can be activated in order to carry out a different depth scan. The computer 60 and monitor 14 for control means is used to load the series of figures into the pulse control. Moreover, the computer can control the stepper motor control 35 directly by way of an index card. The motors can thus be moved automatically to their reference position or start position before the actual depth scan.

Please amend the paragraph on page 22, lines 1-14 as follows:

Figure 10 shows a second embodiment of the invention. The depth scanner 70 corresponds to the depth of Figure 1 in the manner of its construction and its operation. However, in this preferred application, a gantry system is used, which enables the ion beam 3 in a controlled ion beam 26 to be rotated about a gantry axis of rotation 28. By means of the depth modulator or depth scanner 70, the target volume 5 can be scanned in columns and by rotating the gantry system by a few degrees of angle, the target volume can be scanned literally. A

particular advantage of that arrangement is the possibility of arranging the target volume above the isocentre 29 of the gantry system 27. The inlet channel for the ion beam is thus divergent in the upstream direction, which means that both the skin of a patient and also healthy tissue are subjected to less irradiation because the ion beam irradiation in the region above the target volume 5 is distributed over a greater volume. By using the gantry system according to Figure 10, the target volume carrier 30 has to be moved in one direction only, preferably in the direction of the gantry axis of rotation 28, as shown by the arrow directions C.

<u>Please amend the paragraph on page 23, lines 24-page 24, line 4 as follows</u>:

Whereas in the system shown in Figures 10 and 11 the target volume carrier 30 has to be moved in the longitudinal direction in order to irradiate all of the target volume, Figure 12 is a schematic diagram of a third embodiment of the invention in which no further mechanical movement of the target volume is necessary after alignment of the target volume relative to the isocentre. In the embodiment according to Figure 12 <u>showing gantry 4</u>, instead of the target volume carrier, it is the ion beam that is deflected in the beam guidance plane of the gantry system by means of the deflection magnets 23, 24 and 25 of the ion beam guidance system in the gantry system, which does not require much greater outlay for the currents in the deflection magnets since it is not necessary to redesign the deflection magnets because the ion beam would be deflected in the direction of the dipole gap of the last deflection magnets. In that system the same depth scanner 70 is used as in the first and second embodiments of the invention according to Fig. 1 and Fig. 10.